Onondaga Lake's Contaminated Sediments: Characterization and Public Policy Implications

Donald Hughes *

Myrna Hall *

Samuel Sage **

*** SUNY College of Environmental Science & Forestry**

**** Atlantic States Legal Foundation, Inc.**

OUTLINE

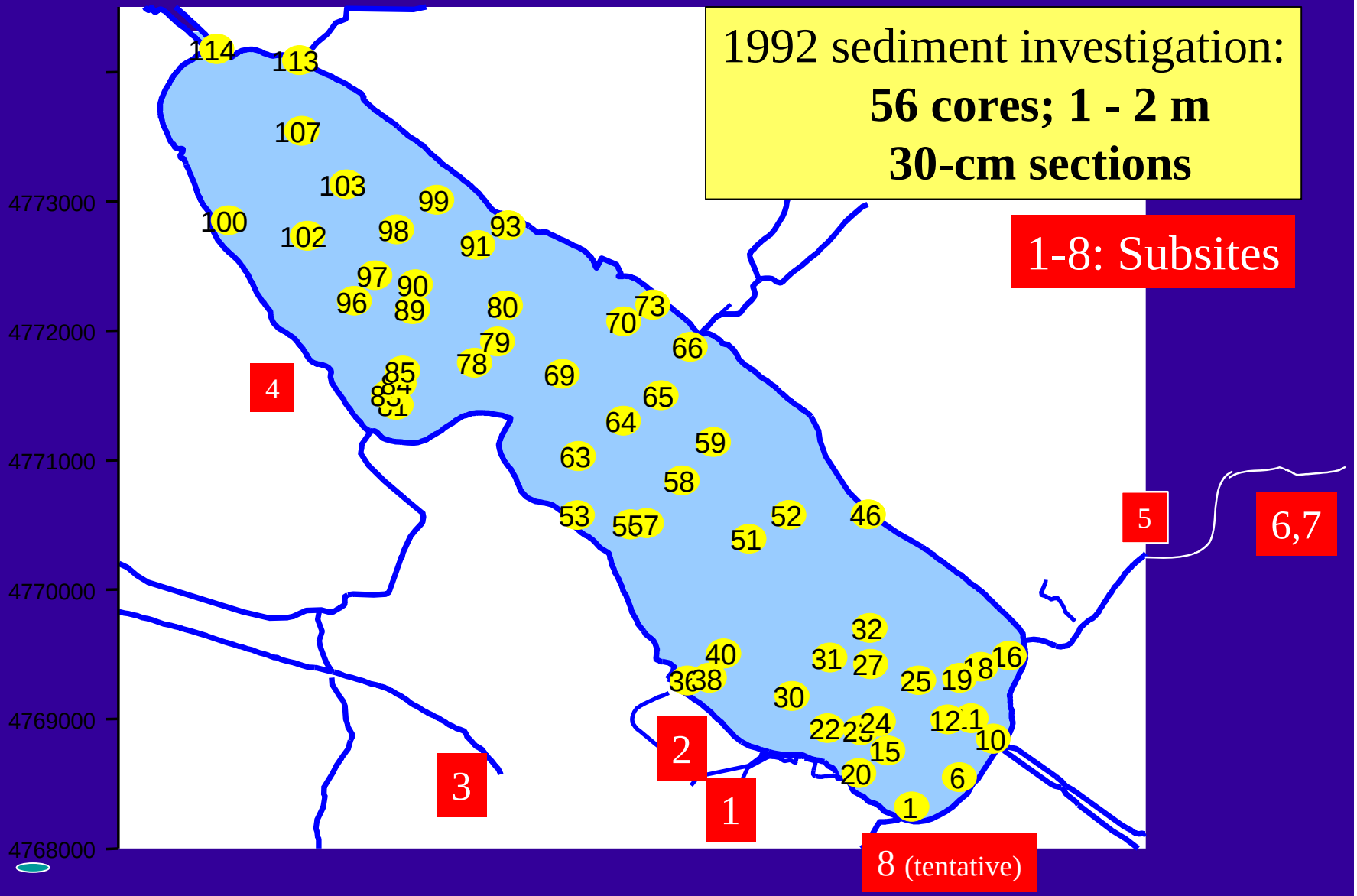
- Onondaga Lake -- Overview
- NYS Sediment screening criteria
- Sediment contamination maps
- Policy implications/ Public involvement

The “Iron Pier” c. 1903

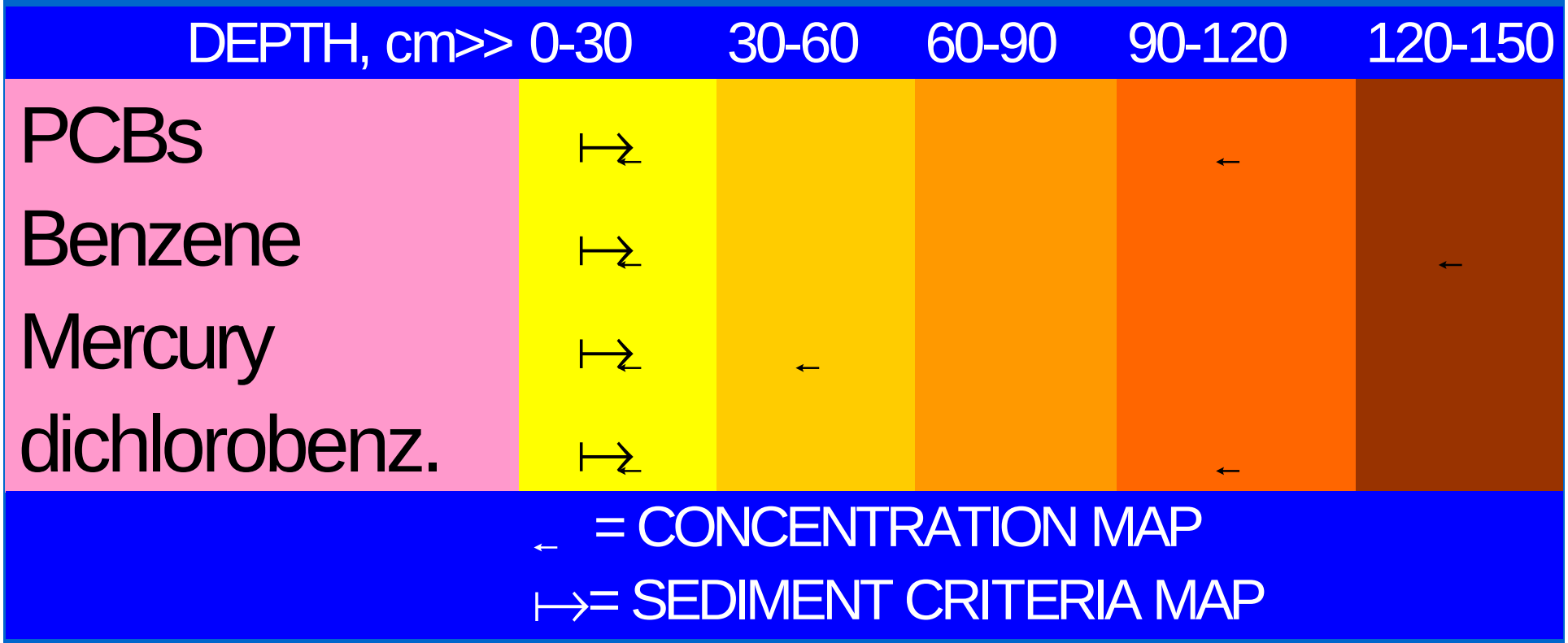
Sources of industrial pollution

- **Soda ash:** salts, $CaCO_3$
- **Chlorine/NaOH:** mercury
- **Coal tar & distillates:** benzene, toluene, xylenes, PAHs, diphenyl ethanes
- **Dichlorobenzenes:** Cl, Cl_2,...Cl_6-benzenes
- **Steel:** various heavy metals
- **Auto/other manufacture:** PCBs

Onondaga Lake Superfund Site



Sediment Mapping in O.L.



New York State Sediment Screening Criteria (SSC)

Uses

- APPARENT EFFECTS THRESHOLD for *metals*
- EQUILIBRIUM PARTITIONING for *non-polar organic compounds*

Sediment Screening Criteria: Endpoints

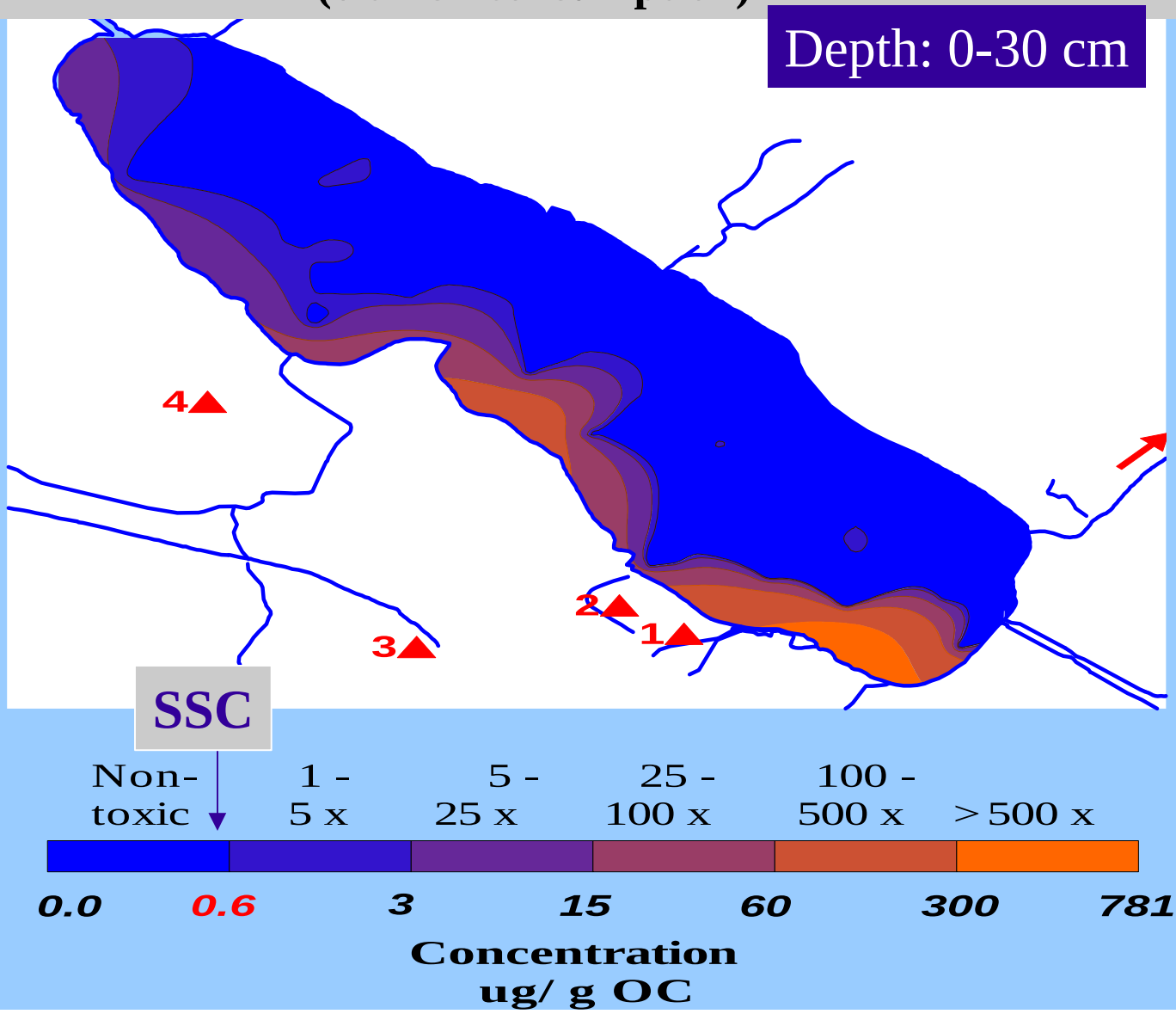
APPARENT EFFECTS THRESHOLD

- benthic organisms

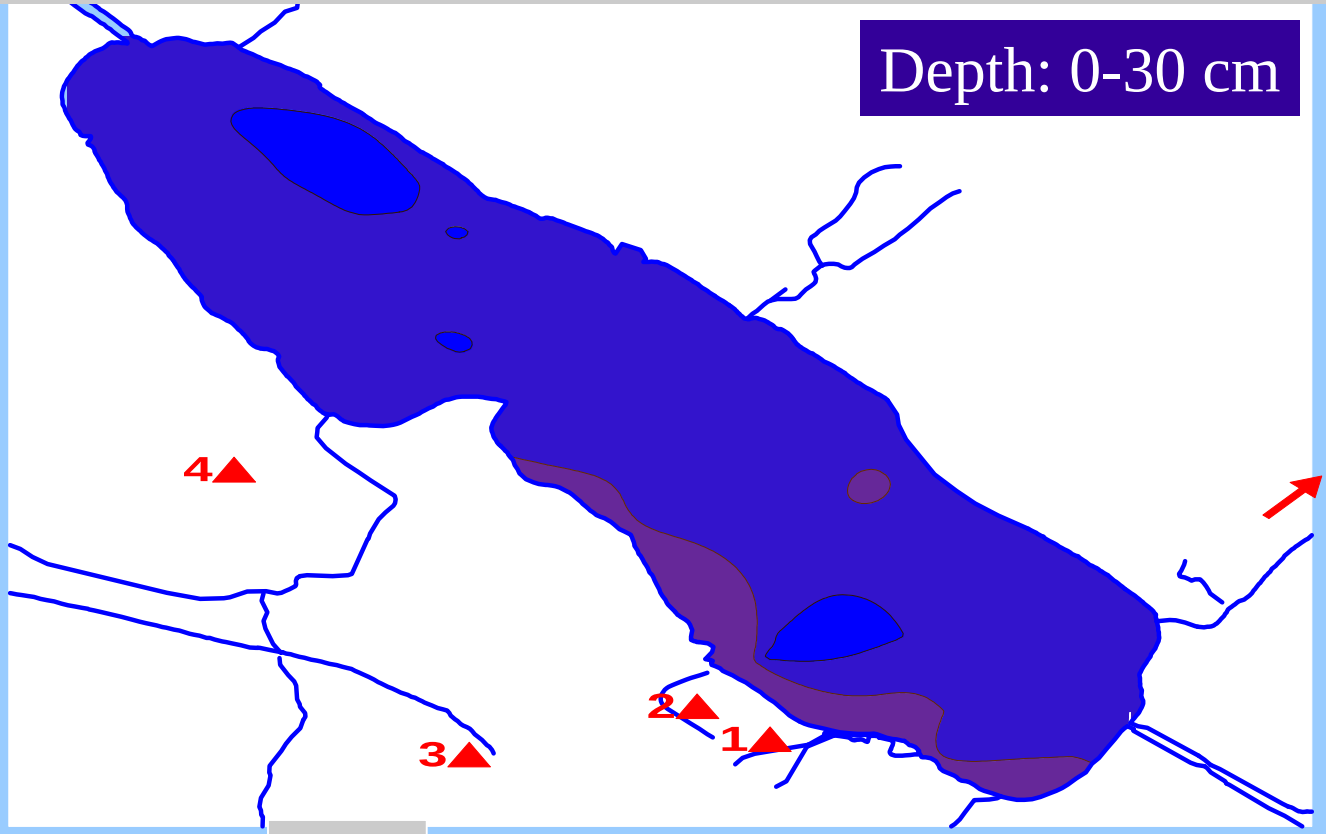
EQUILIBRIUM PARTITIONING

- benthic organisms
- human health (bioaccumulation)
- wildlife health (bioaccumulation)

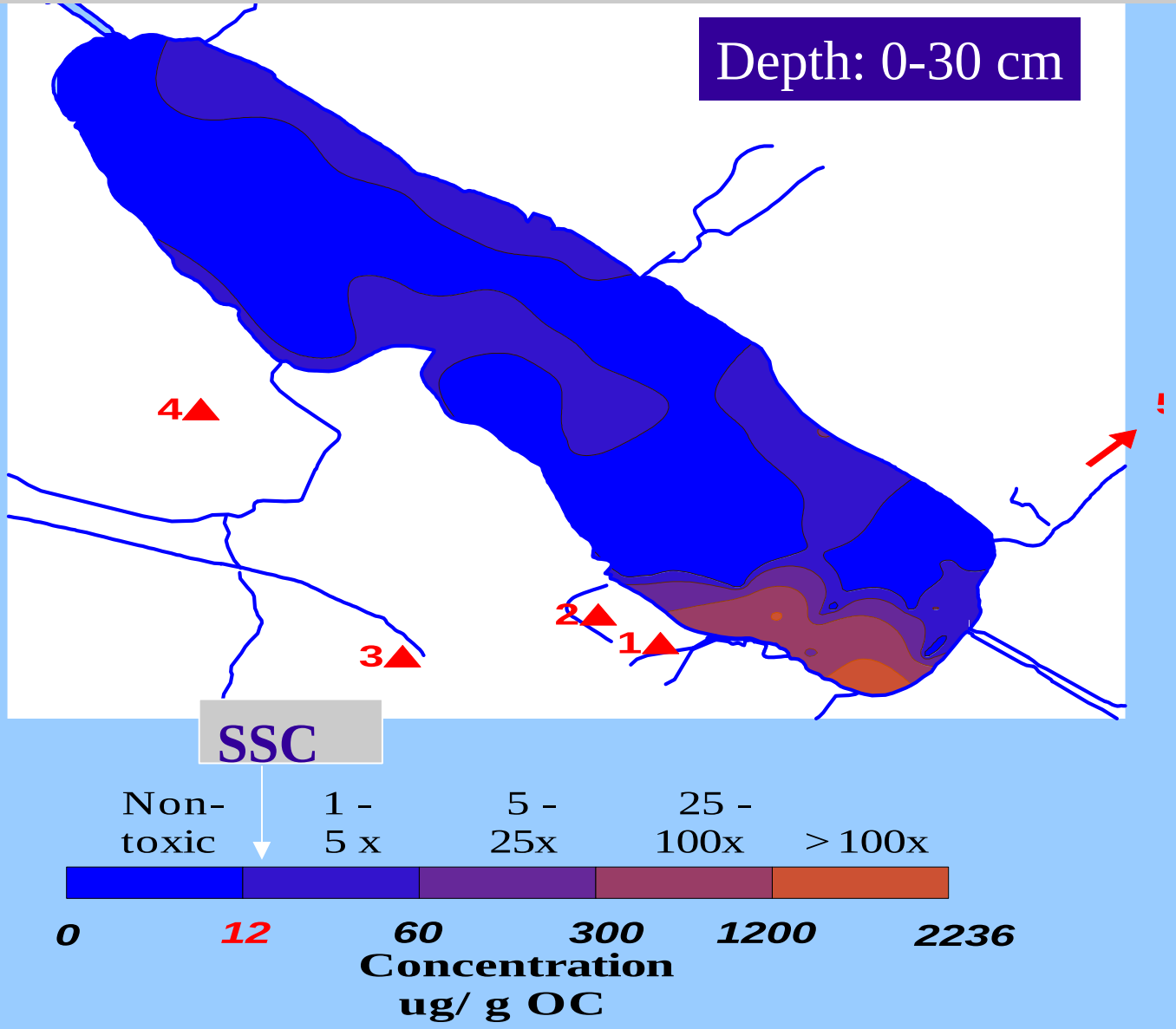
BENZENE:
SSC based on protection of human health
(via fish consumption)



PCBs:
SSC based on toxicity to benthic organisms



DICHLOROBENZENES:
SSC based on toxicity to benthic organisms



Contaminant Toxicity Summary

- Chronic toxicity
  - Hg: >90% of lake is above Severe Effect Level
  - di-CB: SE corner of lake is 25 - 180x SSC
- Toxicity to Wildlife
  - PCBs: >50% of lake is 25 - 300x SSC
- Toxicity to Humans
  - Benzene: 5-10% of lake is 25 - 1300x SSC

Policy Implications of Sediment Mapping

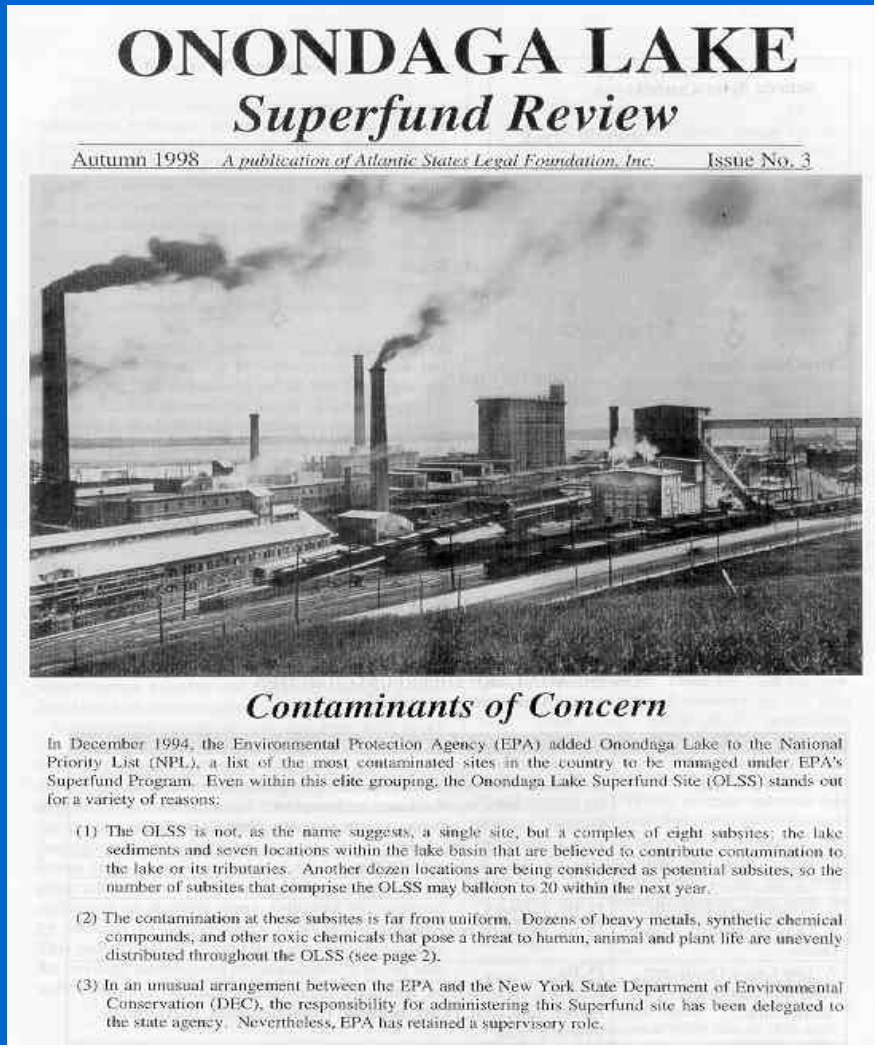
- Clarifies the results of sediment investigations
- Led to new Superfund sub-site (in process)
- Re-evaluation/termination of CSO interceptor system
- Allows citizens to visually assess the data

NYS DEC guidelines:

- remediate when large sediment areas exceed:
  - AET (metals)
  - 50x SSC for benthos (non-polar organics)
- NYS DEC recommends further study if:
  - SSC for human health exceeded
  - SSC for wildlife exceeded

Public Outreach
by Atlantic States Legal Foundation

- Booth at NY State Fair
- Newsletter series
- Newspaper insert
- Public meetings
- Website



ONONDAGA LAKE

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Contaminants of Concern

In December 1994, the Environmental Protection Agency (EPA) added Onondaga Lake to the National Priority List (NPL), a list of the most contaminated sites in the country to be managed under EPA's Superfund Program. Even within this elite grouping, the Onondaga Lake Superfund Site (OLSS) stands out for a variety of reasons:

(1) The OLSS is not, as the name suggests, a single site, but a complex of eight subsites: the lake sediments and seven locations within the lake basin that are believed to contribute contamination to the lake or its tributaries. Another dozen locations are being considered as potential subsites, so the number of subsites that comprise the OLSS may balloon to 20 within the next year.

(2) The contamination at these subsites is far from uniform. Dozens of heavy metals, synthetic chemical compounds, and other toxic chemicals that pose a threat to human, animal and plant life are unevenly distributed throughout the OLSS (see page 2).

(3) In an unusual arrangement between the EPA and the New York State Department of Environmental Conservation (DEC), the responsibility for administering this Superfund site has been delegated to the state agency. Nevertheless, EPA has retained a supervisory role.

The public wants to know: Where are we headed?

- How quickly are sediments buried?
- How erodable?
- Do organisms disturb the sediments?
- What is the impact of multiple chemicals?
- Is dredging a viable option?

Summary

- Large variety of organic and inorganic chemicals in sediments
- Focussed on mercury, dichlorobenzenes, benzene, PCBs
- Concentrations exceed state SSC by wide margins
- Next step: RI report & public review

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